

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION**

**EVS CODEC TECHNOLOGIES, LLC,**

*Plaintiff,*

**v.**

**LG ELECTRONICS, INC., LG  
ELECTRONICS U.S.A., INC. and LG  
ELECTRONICS MOBILECOMM U.S.A.,  
INC.,**

*Defendants.*

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**Case No. 2:18-cv-00343**

**JURY TRIAL DEMANDED**

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**COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff EVS Codec Technologies, LLC (“ECT” or “Plaintiff”) hereby submits this Complaint for patent infringement against Defendants LG Electronics, Inc. (“LGE”), LG Electronics U.S.A., Inc. (“LGUSA”), and LG Electronics Mobilecomm U.S.A., Inc. (“LGEM”) (collectively “LG” or “Defendants”) and states as follows:

**THE PARTIES**

1. ECT is a Texas limited liability company with a principal place of business at 2323 S. Shepherd, 14<sup>th</sup> floor, Houston, Texas 77019-7024.

2. On information and belief, Defendant LGE is a Korean corporation with a principal place of business at LG Twin Towers, 128 Yeoui-daero, Yeongdungpo-gu, Seoul, 07366, South Korea. On information and belief, LGE is the entity that manufactures the LG-branded products sold in the United States, including the accused products in this case. On information and belief, in addition to making the products, LGE is responsible for research and development, product design, and sourcing of components.

3. On information and belief, Defendant LGUSA is a Delaware corporation with a principal place of business at 1000 Sylvan Avenue, Englewood Cliffs, NJ 07632.

4. On information and belief, LGUSA has a regular and established physical place of business within this judicial district at 14901 Beach Street, Fort Worth, Texas 76262 in Denton County, Texas. LGUSA is registered for the right to transact business in Texas. On information and belief, LGUSA has employees who work in the State of Texas.

5. On information and belief, Defendant LGEM is a California corporation with a principal place of business at 10101 Old Grove Rd., San Diego, CA 92131.

6. On information and belief, LGEM has a regular and established physical place of business within this judicial district at 2151-2155 Eagle Parkway, Fort Worth, Texas 76177 in

Denton County, Texas. LGEM is registered for the right to transact business in Texas. On information and belief, LGEM has employees who work in the State of Texas.

### **JURISDICTION AND VENUE**

7. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a) because this action arises under the patent laws of the United States, 35 U.S.C. §§ 101 *et seq.*

8. LG is in the business of supplying mobile devices, such as smartphones and tablets, in the United States.

9. LG has solicited business in the State of Texas, transacted business within the State of Texas and attempted to derive financial benefit from residents of the State of Texas, including benefits directly related to the instant patent infringement cause of action set forth herein.

10. LG has made, used, sold, offered for sale, and/or imported mobile phones and/or has placed such phones into the stream of commerce, which phones have been offered for sale, sold, and/or used in the State of Texas and this judicial district.

11. At the time of filing of this Complaint, LG's mobile phones are available for purchase by consumers in Texas, including within this judicial district.

12. On information and belief, LG has made, used, sold, offered for sale, and/or imported wireless mobile communication devices that are alleged herein to infringe one or more of the patents set forth herein, and/or has placed such devices into the stream of commerce, which devices have been made, offered for sale, sold, and/or used in the State of Texas and within this judicial district.

13. LG sells products in this judicial district that are accused of infringement in this Complaint.

14. LGE is subject to personal jurisdiction in Texas and in this judicial district.

15. LGUSA is subject to personal jurisdiction in Texas and in this judicial district.

16. LGEM is subject to personal jurisdiction in Texas and in this judicial district.

17. LG is subject to personal jurisdiction under the provisions of the Texas Long Arm Statute, TX CIV. PRAC. & REM CODE § 17.041 et seq., by virtue of the fact that, upon information and belief, LG has availed itself of the privilege of conducting and soliciting business within this State, including engaging in at least some of the infringing activities in this State, as well as by others acting as LG's agents and/or representatives, such that it would be reasonable for this Court to exercise jurisdiction consistent with principles underlying the U.S. Constitution, and the exercise of jurisdiction by this Court would not offend traditional notions of fair play and substantial justice.

18. On information and belief, LG has also established minimum contacts with this judicial district and regularly transacts and does business within this district, including advertising, promoting and selling products over the internet, through intermediaries, representatives and/or agents located within this judicial district, that infringe Plaintiff's patents, which products are then sold and/or shipped directly to citizens residing within this State and in this judicial district. Upon further information and belief, LG has purposefully directed activities at citizens of this State including those located within this judicial district.

19. On information and belief, LG has purposefully and voluntarily placed its products into the stream of commerce with the expectation that they will be purchased and used by customers located in the State of Texas and the Eastern District of Texas. On information and belief, LG's customers in the Eastern District of Texas have purchased and used and continue to purchase and use LG's products.

20. Venue as to LGE, a foreign corporation, is proper in this judicial district under 28 U.S.C. §§1391(b)-(d) and 1400(b).

21. Venue as to LGUSA and LGEM is proper in this judicial district under 28 U.S.C. §§1391(b)-(d) and 1400(b) at least because they have committed acts of infringement in this judicial district and have a regular and established place of business in this judicial district.

22. Venue is proper in this federal judicial district pursuant to 28 U.S.C. §§1391(b)-(d) and 1400(b) in that Defendants have done business in this District, have committed acts of infringement in this District, and continue to commit acts of infringement in this District, entitling Plaintiff to relief.

### **SUMMARY**

23. VoiceAge Corporation (“VoiceAge”), the original assignee of the Patents-in-Suit, has been a pioneer in speech and audio compression technologies since its creation in 1999. VoiceAge is widely recognized as the world’s leader in developing cutting-edge technologies for wideband, low bit rate speech and audio compression.<sup>1</sup> For example, VoiceAge has provided technology to the winning codec candidate in at least nineteen international speech and audio standards-based codecs, including standards promulgated by the Third Generation Partnership Project (“3GPP”), 3GPP2, the International Telecommunications Union (“ITU”), the European Telecommunications Standards Institute (“ETSI”), and the Motion Picture Experts Group (“MPEG”) of the International Organization for Standardization (“ISO”).

24. One of the international standards based on the patented technologies of VoiceAge is the Enhanced Voice Services (“EVS”) Codec which, among other features, enables vastly improved voice quality, network capacity and advanced features for voice services over Long Term Evolution (“LTE” or “4G”) networks. The EVS Codec was designed to meet the demands

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<sup>1</sup> VoiceAge was also a leader in narrow-band codecs and innovation.

of packet-switched mobile communications networks and was developed and standardized under the lead of the 3GPP Codec Working Group, 3GPP TSG SA WG4.

25. The technical features of the EVS Codec are set forth by 3GPP in the EVS Standard as set forth, for example, in 3GPP TS 26.441 through 3GPP TS 26.451 and 3GPP TS 26.114.

26. The EVS Codec serves a variety of important, growing markets and applications including, but not limited to, high-definition voice services plus (“HD Voice+”) in wireless telephony, content for media audio, and mobile voice over internet protocol (“VoIP”).

27. The EVS Codec is also referred to as Ultra HD Voice.

28. The EVS Codec is designed for high quality and efficient coding of speech, music and mixed content.

29. The EVS Codec offers numerous benefits to the users. These include, but are not limited to, the following:

- It delivers higher quality, higher frame/packet error resilience, and higher compression efficiency than previous speech codecs, leading to an improved user experience and system efficiency;
- It increases the voice capacity with same or even better quality than HD Voice;
- It enhances the voice and music quality with the same capacity;
- It can be used for high quality music services; and
- It provides improved telecom grade quality and capacity tradeoff.

30. Mobile networks in the United States have deployed the EVS Codec. For example, T-Mobile launched the EVS Codec on its networks starting at least in 2016. On information and belief, Verizon also has EVS functionality in its network.

31. The standardized EVS Codec serves a variety of important, growing markets and applications including, but not limited to, high-definition voice services (“HD Voice+”) for LTE

mobile terminals.<sup>2</sup> Indeed, a mobile device that is “HD Voice+” capable must support the EVS Codec.<sup>3</sup>

32. As part of its development of the new and improved methods and systems for processing speech signals, VoiceAge was awarded a number of patents including U.S. Patent Nos. 6,795,805; 6,807,524; 7,151,802; 7,260,521; 7,191,123 (collectively, “Patents-in-Suit”).

33. This Court is familiar with the Patents-in-Suit, and has presided over several litigations involving the Patents-in-Suit, including *Saint Lawrence Communications LLC v. Apple Inc., et al*; Case No. 2:16-cv-00082-JRG; *Saint Lawrence Communications LLC v. ZTE Corporation, et al*; Case No. 2:15-cv-00349-JRG; *Saint Lawrence Communications LLC v. HTC Corporation, et al*; Case No. 2:15-cv-00919-JRG; *HTC Corporation, et al v. Acacia Research Corporation, et al*; Case No. 2:15-cv-01510-JRG; and *Saint Lawrence Communications LLC v. LG Electronics, Inc., et al*; Case No. 2:14-cv-01055-JRG.

34. This Court is currently presiding over a pending case involving the Patents-in-Suit: *Saint Lawrence Communications LLC v. Motorola Mobility LLC*; Case No. 2:15-cv-00351-JRG.

35. This Court has issued two *Markman* opinions (*Saint Lawrence Communications LLC v. ZTE Corporation, et al*; Case No. 2:15-cv-00349-JRG, Dkt. 236 and *Saint Lawrence Communications LLC v. Apple Inc., et al*; Case No. 2:16-cv-00082-JRG, Dkts. 95 and 170) relating to the Patents-in-Suit and presided over a jury trial (*Saint Lawrence Communications LLC v. Motorola Mobility LLC*; Case No. 2:15-cv-00351-JRG) relating to the Patents-in-Suit.

36. LG was aware of the Patents-in-Suit prior to the filing of this Complaint, at least including through the following:

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<sup>2</sup> <https://www.gsma.com/futurenetworks/wp-content/uploads/2013/04/Annex-H-Version-1.0.pdf>

<sup>3</sup> *Id.*

- the very same patents were asserted against certain LG products using the AMR-WB codec in *Saint Lawrence Communications LLC v. LG Electronics, Inc., et al*; Case No. 2:14-cv-01055-JRG;
- public information about these patents, the EVS Standard, and licensing of these patents; and
- lawsuits in Germany against Deutsche Telekom and Vodafone filed by an affiliate of St. Lawrence (St. Lawrence Communications GmbH).

37. Prior to the filing of this complaint, LG was made aware, by the patent owner, that the EVS Codec infringes the Patents-in-Suit.

38. The allegations in this complaint are made subject to the provisions of any prior license, and do not encompass licensed activity.

39. LG is not licensed to the patents asserted in this Complaint with respect to the use of the EVS Codec, yet LG knowingly, actively, and lucratively practices and induces others to practice the patents with respect to the EVS Codec.

**COUNT I: INFRINGEMENT OF U.S. PATENT NO. 6,795,805**

40. On September 21, 2004, the United States Patent and Trademark Office (“USPTO”) duly and legally issued United States Patent No. 6,795,805 (“the ‘805 Patent”), entitled “Periodicity Enhancement in Decoding Wideband Signals.” Plaintiff has been granted the exclusive right to license products practicing the EVS Standard to the ‘805 Patent.

41. As alleged above, LG had actual notice of the ‘805 Patent and of its infringement of that patent.

42. Upon information and belief, LG has infringed directly and continues to infringe directly the ‘805 Patent. The infringing acts include, but are not limited to, the manufacture, use,



sale, importation, and/or offer for sale of products containing the EVS Codec and/or practicing the EVS Standard in the United States (“LG EVS Products”).

43. LG EVS Products include any LG product that contains the EVS Codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following: LG V30, LG V30+, LG G5, LG G6, LG G6+, LG G7 ThinQ, LG V20, LG V30, LG V30s ThinQ, LG V35 ThinQ, LG Tribute Dynasty, LG X Charge, LG K8+, LG G Pad F2 8.0 and any LG products that contain the EVS Codec including, but not limited to, LG phones containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

44. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the ‘805 Patent.

45. For example, the LG EVS Products practice and/or are capable of practicing representative claim 3 of U.S. Patent No. 6,795,805.

46. Claim 3 of the ‘805 Patent discloses a device for enhancing periodicity of an excitation signal produced in relation to a pitch codevector and an innovative codevector for supplying a signal synthesis filter in view of synthesizing a wideband speech signal, said periodicity enhancing device comprising a factor generator for calculating a periodicity factor related to the wideband speech signal; and an innovation filter for filtering the innovative

codevector in relation to said periodicity factor to thereby reduce energy of a low frequency portion of the innovative codevector and enhance periodicity of a low frequency portion of the excitation signal. Claim 3 further discloses that the innovation filter has a transfer function of the form  $F(z) = -\alpha z + 1 - \alpha z^{-1}$  where  $\alpha$  is a periodicity factor derived from a level of periodicity of the excitation signal.

47. Each of the LG EVS Products includes the EVS Codec, which comprises the disclosed device for enhancing periodicity of representative Claim 3 of the '805 Patent.

48. The EVS Codec in the LG EVS Products complies with the EVS Standard.

49. The EVS Codec processes a speech signal sampled at approximately 16,000 samples/second (i.e., a wideband signal). [*See, e.g.*, Ex. A (3GPP TS 26.445/ETSI TS 126.445), at Table 19].

50. The EVS Standard includes devices for enhancing periodicity of an excitation signal produced in relation to a pitch codevector and an innovative codevector for supplying a signal synthesis filter in view of synthesizing a wideband speech signal. [*See, e.g.*, Ex. A, at sections 1, 4.2, 4.2, 6.1.1, 6.1.3 and corresponding portions of the EVS Reference Code (3GPP TS 26.442)].

51. The periodicity enhancing device of the EVS Standard comprises a factor generator for calculating a periodicity factor related to the wideband speech signal. [*See, e.g.*, Ex. A, at sections 6.1.1.3.2, 6.1.1.3.3 and corresponding portions of the EVS Reference Code]. The periodicity enhancing device of the EVS Standard also comprises an innovation filter for filtering the innovative codevector in relation to said periodicity factor to thereby reduce energy of a low frequency portion of the innovative codevector and enhance periodicity of a low frequency portion of the excitation signal. [*See, e.g.*, Ex. A, at section 6.1.1.3.3, and corresponding portions of the EVS Reference Code].

52. Further, in the EVS Standard, the innovation filter has a transfer function of the form  $F(z) = -\alpha z + 1 - \alpha z^{-1}$  where  $\alpha$  is a periodicity factor derived from a level of periodicity of the excitation signal. [See, e.g., Ex. A, at section 6.1.1.3.3, and corresponding portions of the EVS Reference Code].

53. In addition to its direct infringement, LG has been and is now indirectly infringing by way of inducing infringement and/or contributing to the infringement of the claims of the ‘805 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or more claims of the ‘805 Patent, all to the injury of Plaintiff. In the case of such infringement, the users of the LG EVS Products are the direct infringers of the ‘805 Patent. LG advertises and promotes its LG EVS Products on its website.<sup>4</sup> LG provides, makes, uses, licenses, sells, and offers its LG EVS Products for sale with the specific intent that its customers use those phones in an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by the ‘805 Patent. The EVS Codec has no substantial non-infringing uses and is known by LG to be especially made or especially adapted for use in an infringement of the ‘805 Patent by complying with the EVS Standard. LG’s acts of infringement have been willful, deliberate, and in reckless disregard of Plaintiff’s patent rights.

54. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants’ wrongful acts in an amount subject to proof at trial. The infringement of Plaintiff’s exclusive rights under the ‘805 Patent by Defendants has damaged and will continue to damage Plaintiff.

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<sup>4</sup> See, e.g., <http://www.lg.com/us/cell-phones/all-cell-phones> .

55. Upon information and belief, Defendants actually knew of, or were willfully blind to, the existence of the ‘805 Patent, yet Defendants continue to infringe said patent. The infringement of the ‘805 Patent by Defendants is willful and deliberate, and with full knowledge of the patent, entitling Plaintiff to increased damages under 35 U.S.C. § 284 and to attorneys’ fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

**COUNT II: INFRINGEMENT OF U.S. PATENT NO. 6,807,524**

56. On October 19, 2004, the USPTO duly and legally issued United States Patent No. 6,807,524 (“the ‘524 Patent”), entitled “Perceptual Weighting Device and Method for Efficient Coding of Wideband Signals.” Plaintiff has been granted the exclusive right to license products practicing the EVS Standard to the ‘524 Patent.

57. As alleged above, LG had actual notice of the ‘524 Patent and of its infringement of that patent.

58. Upon information and belief, LG has infringed directly and continues to infringe directly the ‘524 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of the LG EVS Products in the United States.

59. LG EVS Products include any LG product that contains the EVS Codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following: LG V30, LG V30+, LG G5, LG G6, LG G6+, LG G7 ThinQ, LG V20, LG V30, LG V30s ThinQ, LG V35 ThinQ, LG Tribute Dynasty, LG X Charge, LG K8+, LG G Pad F2 8.0 and any LG products that contain the EVS Codec including, but not limited to, LG phones containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio

P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

60. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the '524 Patent.

61. For example, the LG EVS Products practice and/or are capable of practicing representative claim 4 of U.S. Patent No. 6,807,524.

62. Claim 4 of the '524 Patent discloses a perceptual weighting device for producing a perceptually weighted signal in response to a wideband speech signal in order to reduce a difference between the wideband speech signal and a subsequently synthesized wideband speech signal, said perceptual weighting device comprising: (a) a signal preemphasis filter responsive to the wideband speech signal for enhancing a high frequency content of the wideband speech signal to thereby produce a preemphasised signal; (b) a synthesis filter calculator responsive to said preemphasised signal for producing synthesis filter coefficients; and (c) a perceptual weighting filter, responsive to said preemphasised signal and said synthesis filter coefficients, for filtering said preemphasised signal in relation to said synthesis filter coefficients to thereby produce said perceptually weighted signal, said perceptual weighting filter having a transfer function with fixed denominator whereby weighting of said wideband speech signal in a formant region is substantially decoupled from a spectral tilt of said wideband speech signal. Claim 4 further discloses that said signal preemphasis filter has a transfer function of the form  $P(z) = 1 - \mu z^{-1}$ , where  $\mu$  is a preemphasis factor having a value located between 0 and 1, and said perceptual weighting filter has a transfer function of the form  $W(z) = A(z/\gamma_1)/(1 - \gamma_2 z^{-1})$ , where  $0 < \gamma_2 < \gamma_1 \leq 1$  and  $\gamma_2$  and  $\gamma_1$  are weighting control values.

63. Each of the LG EVS Products includes the EVS Codec, which comprises the disclosed perceptual weighting device of representative Claim 4 of the '524 Patent.

64. The EVS Codec in the LG EVS Products complies with the EVS Standard.

65. The EVS Codec processes a speech signal sampled at approximately 16,000 samples/second (i.e., a wideband signal). [*See, e.g.*, Ex. A (3GPP TS 26.445/ETSI TS 126.445), at Table 19].

66. The EVS Standard includes a perceptual weighting device for producing a perceptually weighted signal in response to a wideband speech signal in order to reduce a difference between the wideband speech signal and a subsequently synthesized wideband speech signal. [*See, e.g.*, Ex. A, at sections 1, 3.1, 4.1, 4.2, 5.1.10, 5.1.14.1.1.1, 5.2.1, and corresponding portions of the EVS Reference Code].

67. The perceptual weighting device of the EVS Standard comprises (a) a signal preemphasis filter responsive to the wideband speech signal for enhancing a high frequency content of the wideband speech signal to thereby produce a preemphasised signal [*See, e.g.*, Ex. A, at section 5.1.4, and corresponding portions of the EVS Reference Code]; (b) a synthesis filter calculator responsive to said preemphasised signal for producing synthesis filter coefficients [*See, e.g.*, Ex. A, at sections 5.1.9, 5.2.1, and corresponding portions of the EVS Reference Code]; and (c) a perceptual weighting filter, responsive to said preemphasised signal and said synthesis filter coefficients, for filtering said preemphasised signal in relation to said synthesis filter coefficients to thereby produce said perceptually weighted signal, said perceptual weighting filter having a transfer function with fixed denominator whereby weighting of said wideband speech signal in a formant region is substantially decoupled from a spectral tilt of said wideband speech signal [*See, e.g.*, Ex. A, at sections 5.1.10.1, 5.2.1, and corresponding portions of the EVS Reference Code].

68. In the EVS Standard, the signal preemphasis filter has a transfer function of the form  $P(z) = 1 - \mu z^{-1}$ , where  $\mu$  is a preemphasis factor having a value located between 0 and 1. [See, e.g., Ex. A, at section 5.1.4, and corresponding portions of the EVS Reference Code].

69. In the EVS Standard, the perceptual weighting filter has a transfer function of the form  $W(z) = A(z/\gamma_1)/(1 - \gamma_2 z^{-1})$ , where  $0 < \gamma_2 < \gamma_1 \leq 1$  and  $\gamma_2$  and  $\gamma_1$  are weighting control values. [See, e.g., Ex. A, at sections 5.1.10.1, 5.2.1 and corresponding portions of the EVS Reference Code].

70. In addition to its direct infringement, LG has been and is now indirectly infringing by way of inducing infringement and/or contributing to the infringement of the claims of the ‘524 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or more claims of the ‘524 Patent, all to the injury of Plaintiff. In the case of such infringement, the users of the LG EVS Products are the direct infringers of the ‘524 Patent. LG advertises and promotes its LG EVS Products on its website.<sup>5</sup> LG provides, makes, uses, licenses, sells, and offers its LG EVS Products for sale with the specific intent that its customers use those phones in an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by Plaintiff’s patent. The EVS Codec has no substantial non-infringing uses and is known by LG to be especially made or especially adapted for use in an infringement of the ‘524 Patent by complying with the EVS Standard. LG’s acts of infringement have been willful, deliberate, and in reckless disregard of Plaintiff’s patent rights.

71. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of

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<sup>5</sup> See, e.g., <http://www.lg.com/us/cell-phones/all-cell-phones>.

Defendants' wrongful acts in an amount subject to proof at trial. The infringement of Plaintiff's exclusive rights under the '524 Patent by Defendants has damaged and will continue to damage Plaintiff.

72. Upon information and belief, Defendants actually knew of, or were willfully blind to, the existence of the '524 Patent, yet Defendants continue to infringe said patent. The infringement of the '524 Patent by Defendants is willful and deliberate, and with full knowledge of the patent, entitling Plaintiff to increased damages under 35 U.S.C. § 284 and to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

**COUNT III: INFRINGEMENT OF U.S. PATENT NO. 7,151,802**

73. On December 19, 2006, the USPTO duly and legally issued United States Patent No. 7,151,802 ("the '802 Patent"), entitled "High Frequency Content Recovering Method and Device for Over-Sampled Synthesized Wideband Signal." Plaintiff has been granted the exclusive right to license products practicing the EVS Standard to the '802 Patent.

74. As alleged above, LG had actual notice of the '802 Patent and of its infringement of that patent.

75. Upon information and belief, LG has infringed directly and continues to infringe directly the '802 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of the LG EVS Products in the United States.

76. LG EVS Products include any LG product that contains the EVS Codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following: LG V30, LG V30+, LG G5, LG G6, LG G6+, LG G7 ThinQ, LG V20, LG V30, LG V30s ThinQ, LG V35 ThinQ, LG Tribute Dynasty, LG X Charge, LG K8+, LG G Pad F2 8.0 and any LG products that contain the EVS Codec including, but not limited to, LG phones containing the Qualcomm



Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

77. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the '802 Patent.

78. For example, the LG EVS Products practice and/or are capable of practicing representative claim 1 of U.S. Patent No. 7,151,802.

79. Claim 1 of the '802 Patent discloses a decoder for producing a synthesized wideband signal, comprising: a) a signal fragmenting device for receiving an encoded version of a wideband signal previously down-sampled during encoding and extracting from said encoded wideband signal version at least pitch codebook parameters, innovative codebook parameters, and linear prediction filter coefficients; b) a pitch codebook responsive to said pitch codebook parameters for producing a pitch codevector; c) an innovative codebook responsive to said innovative codebook parameters for producing an innovative codevector; d) a combiner circuit for combining said pitch codevector and said innovative codevector to thereby produce an excitation signal; e) a signal synthesis device including a linear prediction filter for filtering said excitation signal in relation to said linear prediction filter coefficients to thereby produce a synthesized wideband signal, and an oversampler responsive to said synthesized wideband signal for producing an over-sampled signal version of the synthesized wideband signal; and f) a high-frequency content recovering device. This high-frequency content recovering device further comprises: i) a

random noise generator for producing a noise sequence having a given spectrum; ii) a spectral shaping unit for shaping the spectrum of the noise sequence in relation to linear prediction filter coefficients related to said down-sampled wideband signal; and iii) a signal injection circuit for injecting said spectrally-shaped noise sequence in said over-sampled synthesized signal version to thereby produce said full-spectrum synthesized wideband signal.

80. Each of the LG EVS Products includes the EVS Codec, which comprises the disclosed device for enhancing periodicity of representative Claim 1 of the '802 Patent.

81. The EVS Codec in the LG EVS Products complies with the EVS Standard.

82. The EVS Codec processes a speech signal sampled at approximately 16,000 samples/second (i.e., a wideband signal). [*See, e.g.*, Ex. A (3GPP TS 26.445/ETSI TS 126.445), at Table 19].

83. The EVS Standard includes a decoder for producing a synthesized wideband signal. [*See, e.g.*, Ex. A, at sections 1, 4.1, 4.2, 5.1.14, 5.2.6.2.2, 6.1.1 and corresponding portions of the EVS Reference Code].

84. The decoder of the EVS Standard comprises a) a signal fragmenting device for receiving an encoded version of a wideband signal previously down-sampled during encoding and extracting from said encoded wideband signal version at least pitch codebook parameters, innovative codebook parameters, and linear prediction filter coefficients [*See, e.g.*, Ex. A, at sections 4.1, 4.2, 5.1.3, 4.4.2, 6.1.1, and corresponding portions of the EVS Reference Code]; b) a pitch codebook responsive to said pitch codebook parameters for producing a pitch codevector [*See, e.g.*, Ex. A, at section 5.2.3.1.4.1, and corresponding portions of the EVS Reference Code]; c) an innovative codebook responsive to said innovative codebook parameters for producing an innovative codevector [*See, e.g.*, Ex. A, at sections 5.2.3.1, 6.1.1.2.1.4, Fig. 25 and corresponding portions of the EVS Reference Code]; d) a combiner circuit for combining said pitch codevector

and said innovative codevector to thereby produce an excitation signal [*See, e.g.*, Ex. A, at section 6.1.1.2.1.8, and corresponding portions of the EVS Reference Code]; e) a signal synthesis device including a linear prediction filter for filtering said excitation signal in relation to said linear prediction filter coefficients to thereby produce a synthesized wideband signal, and an oversampler responsive to said synthesized wideband signal for producing an over-sampled signal version of the synthesized wideband signal [*See, e.g.*, Ex. A, at section 5.2.6.2.2 (referencing TS 26.190 at 6.1.3, 6.2), and corresponding portions of the EVS Reference Code]; and f) a high-frequency content recovering device [*See, e.g.*, Ex. A, at section 5.2.6.2.2 (referencing TS 26.190 at 6.3), and corresponding portions of the EVS Reference Code].

85. The high frequency content recovering device of the EVS Standard includes i) a random noise generator for producing a noise sequence having a given spectrum [*See, e.g.*, Ex. A, at section 5.2.6.2.2 (referencing TS 26.190 at 6.3.1), and corresponding portions of the EVS Reference Code]; ii) a spectral shaping unit for shaping the spectrum of the noise sequence in relation to linear prediction filter coefficients related to said down-sampled wideband signal [*See, e.g.*, Ex. A, at section 5.2.6.2.2 (referencing TS 26.190 at 6.3.2.2), and corresponding portions of the EVS Reference Code]; and iii) a signal injection circuit for injecting said spectrally-shaped noise sequence in said over-sampled synthesized signal version to thereby produce said full-spectrum synthesized wideband signal [*See, e.g.*, Ex. A, at section 5.2.6.2.2 (referencing TS 26.190 at 6.3.3), and corresponding portions of the EVS Reference Code].

86. In addition to its direct infringement, LG has been and is now indirectly infringing by way of inducing infringement and/or contributing to the infringement of the claims of the '802 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or more claims of the '802 Patent, all to the injury of Plaintiff. In

the case of such infringement, the users of the LG EVS Products are the direct infringers of the ‘802 Patent. LG advertises and promotes its LG EVS Products on its website.<sup>6</sup> LG provides, makes, uses, licenses, sells, and offers its LG EVS Products for sale with the specific intent that its customers use those phones in an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by the ‘802 Patent. The EVS Codec has no substantial non-infringing uses and is known by LG to be especially made or especially adapted for use in an infringement of the ‘802 Patent by complying with the EVS Standard. LG’s acts of infringement have been willful, deliberate, and in reckless disregard of Plaintiff’s patent rights.

87. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants’ wrongful acts in an amount subject to proof at trial. The infringement of Plaintiff’s exclusive rights under the ‘802 Patent by Defendants has damaged and will continue to damage Plaintiff.

88. Upon information and belief, Defendants actually knew of, or were willfully blind to, the existence of the ‘802 Patent, yet Defendants continue to infringe said patent. The infringement of the ‘802 Patent by Defendants is willful and deliberate, and with full knowledge of the patent, entitling Plaintiff to increased damages under 35 U.S.C. § 284 and to attorneys’ fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

#### **COUNT IV: INFRINGEMENT OF U.S. PATENT NO. 7,260,521**

89. On August 21, 2007, the USPTO duly and legally issued United States Patent No. 7,260,521 (“the ‘521 Patent”), entitled “Method and Device for Adaptive Bandwidth Pitch Search

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<sup>6</sup> See, e.g., <http://www.lg.com/us/cell-phones/all-cell-phones>.

in Coding Wideband Signals.” Plaintiff has been granted the exclusive right to license products practicing the EVS Standard to the ‘521 Patent.

90. As alleged above, LG had actual notice of the ‘521 Patent and of its infringement of that patent.

91. Upon information and belief, LG has infringed directly and continues to infringe directly the ‘521 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of the LG EVS Products in the United States.

92. LG EVS Products include any LG product that contains the EVS Codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following: LG V30, LG V30+, LG G5, LG G6, LG G6+, LG G7 ThinQ, LG V20, LG V30, LG V30s ThinQ, LG V35 ThinQ, LG Tribute Dynasty, LG X Charge, LG K8+, LG G Pad F2 8.0 and any LG products that contain the EVS Codec including, but not limited to, LG phones containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

93. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the ‘521 Patent.

94. For example, the LG EVS Products practice and/or are capable of practicing representative claim 2 of U.S. Patent No. 7,260,521.

95. Claim 2 of the '521 Patent discloses a pitch analysis device for producing a set of pitch codebook parameters comprising a pitch codebook search device configured to generate a pitch codevector based on a digitized input audio data, wherein said digitized input audio data represents an input audio signal that has been sampled and digitized. Claim 2 further discloses at least two signal paths associated to respective sets of pitch codebook parameters representative of said digitized input audio data, wherein each signal path comprises a pitch prediction error calculating device for calculating a pitch prediction error of said pitch codevector from said pitch codebook search device, and at least one of said at least two signal paths comprises a filter for filtering the pitch codevector before supplying said pitch codevector to the pitch prediction error calculating device of said at least one signal path. Claim 2 also discloses a selector for comparing the pitch prediction errors calculating in said at least two signal paths, for choosing the signal path having the lowest calculated pitch prediction error and for selecting the set of pitch codebook parameters associated to the chosen signal path. Claim 2 further discloses one of said at least two signal paths comprises no filter for filtering the pitch codevector before supplying said pitch codevector to the pitch prediction error calculating device.

96. Each of the LG EVS Products includes the EVS Codec, which comprises the disclosed pitch analysis device of representative Claim 2 of the '521 Patent.

97. The EVS Codec in the LG EVS Products complies with the EVS Standard.

98. The EVS Codec processes a speech signal sampled at approximately 16,000 samples/second (i.e., a wideband signal). [*See, e.g.*, Ex. A (3GPP TS 26.445/ETSI TS 126.445), at Table 19].

99. The EVS Standard includes a pitch analysis device for producing a set of pitch codebook parameters. [*See, e.g.*, Ex. A, at sections 1, 3.1, 4.1, 4.2, 4.4.1.1, 5.2, and corresponding portions of the EVS Reference Code].

100. The pitch analysis device of the EVS Standard includes a pitch codebook search device configured to generate a pitch codevector based on a digitized input audio data, wherein said digitized input audio data represents an input audio signal that has been sampled and digitized. [See, e.g., Ex. A, at sections 4.2, 5.2, Fig. 25, and corresponding portions of the EVS Reference Code].

101. The EVS Standard includes at least two signal paths associated to respective sets of pitch codebook parameters representative of said digitized input audio data. [See, e.g., Ex. A, at section 5.2.3.1.4, and corresponding portions of the EVS Reference Code]. Each signal path comprises a pitch prediction error calculating device for calculating a pitch prediction error of said pitch codevector from said pitch codebook search device. [See, e.g., Ex. A, at section 5.2.3.1.4, and corresponding portions of the EVS Reference Code].

102. In the EVS Standard, at least one of said at least two signal paths comprises a filter for filtering the pitch codevector before supplying said pitch codevector to the pitch prediction error calculating device of said at least one signal path. [See, e.g., Ex. A, at section 5.2.3.1.4, Table 37 and corresponding portions of the EVS Reference Code].

103. The EVS Standard includes a selector for comparing the pitch prediction errors calculated in said at least two signal paths, for choosing the signal path having the lowest calculated pitch prediction error and for selecting the set of pitch codebook parameters associated to the chosen signal path. [See, e.g., Ex. A, at section 5.2.3.1.4, Table 37 and corresponding portions of the EVS Reference Code].

104. In the EVS Standard, one of said at least two signal paths comprises no filter for filtering the pitch codevector before supplying said pitch codevector to the pitch prediction error calculating device. [See, e.g., Ex. A, at section 5.2.3.1.4, Table 37 and corresponding portions of the EVS Reference Code].

105. In addition to its direct infringement, LG has been and is now indirectly infringing by way of inducing infringement and/or contributing to the infringement of the claims of the ‘521 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or more claims of the ‘521 Patent, all to the injury of Plaintiff. In the case of such infringement, the users of the LG EVS Products are the direct infringers of the ‘521 Patent. LG advertises and promotes its LG EVS Products on its website.<sup>7</sup> LG provides, makes, uses, licenses, sells, and offers its LG EVS Products for sale with the specific intent that its customers use those phones in an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by the ‘521 Patent. The EVS Codec has no substantial non-infringing uses and is known by LG to be especially made or especially adapted for use in an infringement of the ‘521 Patent by complying with the EVS Standard. LG’s acts of infringement have been willful, deliberate, and in reckless disregard of Plaintiff’s patent rights.

106. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants’ wrongful acts in an amount subject to proof at trial. The infringement of Plaintiff’s exclusive rights under the ‘521 Patent by Defendants has damaged and will continue to damage Plaintiff.

107. Upon information and belief, Defendants actually knew of, or were willfully blind to, the existence of the ‘521 Patent, yet Defendants continue to infringe said patent. The infringement of the ‘521 Patent by Defendants is willful and deliberate, and with full knowledge

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<sup>7</sup> See, e.g., <http://www.lg.com/us/cell-phones/all-cell-phones>.



of the patent, entitling Plaintiff to increased damages under 35 U.S.C. § 284 and to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

**COUNT V: INFRINGEMENT OF U.S. PATENT NO. 7,191,123**

108. On March 13, 2007, the USPTO duly and legally issued United States Patent No. 7,191,123 ("the '123 Patent"), entitled "Gain-Smoothing in Wideband Speech and Audio Signal Decoder." Plaintiff has been granted the exclusive right to license products practicing the EVS Standard to the '123 Patent.

109. As alleged above, LG had actual notice of the '123 Patent and of its infringement of that patent.

110. Upon information and belief, LG has infringed directly and continues to infringe directly the '123 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of the LG EVS Products in the United States.

111. LG EVS Products include any LG product that contains the EVS Codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following: LG V30, LG V30+, LG G5, LG G6, LG G6+, LG G7 ThinQ, LG V20, LG V30, LG V30s ThinQ, LG V35 ThinQ, LG Tribute Dynasty, LG X Charge, LG K8+, LG G Pad F2 8.0 and any LG products that contain the EVS Codec including, but not limited to, LG phones containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23,

MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

112. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the '123 Patent.

113. For example, the LG EVS Products practice and/or are capable of practicing representative claim 102 of U.S. Patent No. 7,191,123.

114. Claim 102 of the '123 Patent discloses a device for producing a gain-smoothed codevector during decoding of an encoded wideband signal from a set of wideband signal encoding parameters, said device comprising: means for finding a codevector in relation to at least one first wideband signal encoding parameter of said set; means for calculating a factor representative of voicing in the wideband signal in response to at least one second wideband signal encoding parameter of said set; means for calculating a smoothing gain using a non linear operation based on said voicing representative factor; and means for amplifying the found codevector with said smoothing gain to thereby produce said gain-smoothed codevector.

115. Each of the LG EVS Products includes the EVS Codec, which comprises the disclosed device for producing a gain-smoothed codevector of representative Claim 102 of the '123 Patent.

116. The EVS Codec in the LG EVS Products complies with the EVS Standard.

117. The EVS Codec processes a speech signal sampled at approximately 16,000 samples/second (i.e., a wideband signal). [*See, e.g.*, Ex. A (3GPP TS 26.445/ETSI TS 126.445), at Table 19].

118. The EVS Standard includes a device for producing a gain-smoothed codevector during decoding of an encoded wideband signal from a set of wideband signal encoding

parameters. [*See, e.g.*, Ex. A, at sections 1, 4.1, 4.2, 6.1, and corresponding portions of the EVS Reference Code].

119. The device for producing a gain-smoothed codevector of EVS Standard includes means for finding a codevector in relation to at least one first wideband signal encoding parameter of said set. [*See, e.g.*, Ex. A, at section 6.1, and corresponding portions of the EVS Reference Code].

120. The device for producing a gain-smoothed codevector of EVS Standard further includes means for calculating a factor representative of voicing in the wideband signal in response to at least one second wideband signal encoding parameter of said set. [*See, e.g.*, Ex. A, at sections 6.1.1.2, 6.1.1.3.2 and corresponding portions of the EVS Reference Code].

121. The device for producing a gain-smoothed codevector of EVS Standard includes means for calculating a smoothing gain using a non-linear operation based on said voicing representative factor. [*See, e.g.*, Ex. A, at sections 6.1.1.2.1.7, 6.1.1.3.2 and corresponding portions of the EVS Reference Code].

122. The device for producing a gain-smoothed codevector of EVS Standard includes means for amplifying the found codevector with said smoothing gain to thereby produce said gain-smoothed codevector. [*See, e.g.*, Ex. A, at section 6.1.1.2.1.8, and corresponding portions of the EVS Reference Code].

123. In addition to its direct infringement, LG has been and is now indirectly infringing by way of inducing infringement and/or contributing to the infringement of the claims of the ‘123 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or more claims of the ‘123 Patent, all to the injury of Plaintiff. In the case of such infringement, the users of the LG EVS Products are the direct infringers of the

‘123 Patent. LG advertises and promotes its LG EVS Products on its website.<sup>8</sup> LG provides, makes, uses, licenses, sells, and offers its LG EVS Products for sale with the specific intent that its customers use those phones in an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by the ‘123 Patent. The EVS Codec has no substantial non-infringing uses and is known by LG to be especially made or especially adapted for use in an infringement of the ‘123 Patent by complying with the EVS Standard. LG’s acts of infringement have been willful, deliberate, and in reckless disregard of Plaintiff’s patent rights.

124. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants’ wrongful acts in an amount subject to proof at trial. The infringement of Plaintiff’s exclusive rights under the ‘123 Patent by Defendants has damaged and will continue to damage Plaintiff.

125. Upon information and belief, Defendants actually knew of, or were willfully blind to, the existence of the ‘123 Patent, yet Defendants continue to infringe said patent. The infringement of the ‘123 Patent by Defendants is willful and deliberate, and with full knowledge of the patent, entitling Plaintiff to increased damages under 35 U.S.C. § 284 and to attorneys’ fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

### **JURY DEMAND**

126. Plaintiff hereby demands a trial by jury on all issues.

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<sup>8</sup> See, e.g., <http://www.lg.com/us/cell-phones/all-cell-phones>.

**PRAYER FOR RELIEF**

WHEREFORE, Plaintiff requests entry of judgment in its favor and against Defendants as follows:

- a. A declaration that Defendants have infringed and are infringing the ‘805, ‘524, ‘802, ‘521, and ‘123 Patents;
- b. A declaration that Defendants have willfully infringed the ‘805, ‘524, ‘802, ‘521, and ‘123 Patents;
- c. An award of damages to Plaintiff arising out of Defendants’ infringement of the ‘805, ‘524, ‘802, ‘521, and ‘123 Patents, including enhanced damages pursuant to 35 U.S.C. § 284, together with prejudgment and post-judgment interest, in an amount according to proof;
- d. An award of attorneys’ fees pursuant to 35 U.S.C. § 285 or as otherwise permitted by law;
- e. An award to Plaintiff of its costs; and
- f. Such other and further relief, whether legal, equitable, or otherwise, to which Plaintiff may be entitled or which this Court may order.

Dated: August 6, 2018

Respectfully submitted,

/s/ Demetrios Anaipakos

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